WHAT IS CLAIMED IS:

1. A linear motor comprising:

first magnets arrayed such that polarization directions thereof are periodically opposite, second magnets arrayed adjacent to said first magnets such that polarization directions thereof are periodically opposite, and an electromagnetic coil opposing said first and second magnets to generate the Lorentz force by at least said first and second magnets,

said second magnets being disposed such that the polarization directions thereof intersect those of said first magnets.

2. The linear motor according to claim 1, wherein the polarization directions of said second magnets intersect those of the first magnets at an angle of substantially 90°.

3. The linear motor according to claim 1, wherein said first and second magnets are rectangular parallelepiped permanent magnets.

4. The linear motor according to claim 1, wherein said electromagnetic coil comprises at least two electromagnetic coils disposed to oppose said first and second magnets and to be energized simultaneously.

5. The linear motor according to claim 1, wherein said first and second magnets are permanent magnets with the same shape.

6. The permanent magnet according to claim 1,

wherein either one of said first and second magnets which is disposed at a terminal end has a volume smaller than those of other magnets.

7. The linear motor according to claim 1, wherein said first and second magnets generate a sine wave magnetic field.

8. A stage apparatus comprising:

a linear motor including first magnets arrayed such that polarization directions thereof are periodically opposite, second magnets arrayed adjacent to said first magnets such that polarization directions thereof are periodically opposite, and an electromagnetic coil opposing said first and second magnets to generate the Lorentz force by at least said first and second magnets, said second magnets being disposed such that the polarization directions thereof intersect those of said first magnets; and

a stage driven by said linear motor,

said electromagnetic coil being energized to move said electromagnetic coil and said first and second magnets relative to each other, thereby driving said stage.

9. An exposure apparatus comprising:

a linear motor including first magnets arrayed such that polarization directions thereof are periodically opposite, second magnets arrayed adjacent to said first magnets such that polarization directions

thereof are periodically opposite, and an electromagnetic coil opposing said first and second magnets to generate the Lorentz force by at least said first and second magnets, said second magnets being disposed such that the polarization directions thereof intersect those of said first magnets; and

a stage driven by said linear motor,

said electromagnetic coil being energized to move said electromagnetic coil and said first and second magnets relative to each other, thereby positioning either one or both of a substrate and a master with a stage apparatus comprising a linear motor.

10. A device manufacturing method, comprising;

positioning at least one of a substrate and a master on an exposure apparatus by controlling a stage apparatus comprising a linear motor including first magnets arrayed such that polarization directions thereof are periodically opposite, second magnets arrayed adjacent to the first magnets such that polarization directions thereof are periodically opposite, and an electromagnetic coil opposing the first and second magnets to generate the Lorentz force by at least the first and second magnets, the second magnets being disposed such that the polarization directions thereof intersect those of the first magnets, and a stage driven by the linear motor, the stage apparatus being adapted to drive the stage by

energizing the electromagnetic coil to move the electromagnetic coil and the first and second magnets relative to each other; and

transferring a pattern of said master onto said substrate.